

Example:

Write a function (subroutine) subprogram to calculate the factorial of a number and use it to compute the value of A from the following equation:

$$A = \frac{K!(M-N)!}{K! - M!}$$

Solution

```
!      Main Program                                ! Function Subprogram
PROGRAM EXAMPLE_FUNCTION                          REAL FUNCTION FACT(J)
IMPLICIT NONE                                    INTEGER :: I,J
INTEGER:: K,M,N                                  ! -----
REAL :: A, FACT                                  FACT = 1.0
READ*, K,M,N                                      DO I=2,J
A= FACT(K)*FACT(M-N)/(FACT(K) - FACT(M))      FACT = FACT*I
PRINT 10, A                                       END DO
10      FORMAT (1X, 'A=', F7.2)                  ! -----
STOP                                              RETURN
END PROGRAM EXAMPLE_FUNCTION                      END FUNCTION FACT
```

```
!      Main Program                                ! Subroutine Subprogram
PROGRAM EXAMPLE_SUBROUTINE                       SUBROUTINE FACT(J,F)
IMPLICIT NONE                                    INTEGER :: I,J
INTEGER:: K,M,N                                  REAL :: F
REAL :: A, F                                      ! -----
READ*, K,M,N                                      F = 1.0
CALL FACT(K,FK)                                  DO I=2,J
CALL FACT(M,FM)                                  F = F*I
CALL FACT(M-N,FMN)                               END DO
A= FK*FMN/(FK - FM)                              ! -----
PRINT 10, A                                       RETURN
10      FORMAT (1X, 'A=', F7.2)                  END SUBROUTINE FACT
STOP
END PROGRAM EXAMPLE_ SUBROUTINE
```